

REMARKS

The changes in spelling to page 8 of the specification and claims 7 and 8 correct obvious typographical errors.

The main change to the claims resides in the incorporation into Claim 1 the subject matter of claims 3 and 9, which are cancelled. This change requires that the treating solution have a pH of at least 7 and that the chelating agent is an aminopolycarboxylate chelating agent. Original claims 1 and 2 have been re-written in Jepson form to more clearly delineate the broader concepts of the invention

The present invention is an improvement on the known *in situ* process for treating contaminated soils and ground waters with an aqueous solution of a peroxide and a divalent metal which is a catalyst which allows free radicals to be formed from the peroxide. These free radicals oxidize the contaminants to harmless species. In some instances, the prior art has suggested using the divalent metal in the form of a water soluble chelate. While having been used commercially this process has drawbacks.

The catalytic decomposition of the peroxide as well as the oxidation of the organic contaminants being treated generates a large amount of undesirable heat. Further, by injecting the peroxide and the catalyst simultaneously or sequentially the reaction

producing the generation radicals occurs before the treatment has reached many of the contaminated areas of the formation being treated. Also, when the catalyst, particularly iron catalysts are used, they are incompatible with the peroxide and must be fed separately. In some cases acid cleaning may be eliminated as a pretreatment of the formation.

The presently claimed invention overcomes these problems by using dilute solutions of the reagents. The catalyst is formed by injecting a chelating solution into the formation or contaminated water which formations or their underground waters contain a quantity of catalytically active metals which in their soluble form catalyze the oxidation reactions described above. It was unexpected that chelating agents and in particular, certain aminocarboxylate chelants, could form metal complexes with the catalytic metals found in underground formations and waters.

By utilizing the teachings of the invention it was surprisingly found that :

1. the decontamination of the treated media was vastly improved;
2. the generation of excessive heat was substantially diminished;
3. More dilute solutions of treating reagents could be employed;
4. Feeding of heavy metals was eliminated thus effectuating a cost savings; and
5. The sometimes necessary pre-treatment of the formations with acid is no longer necessary.

See also page 17 of the Specification for a more detailed discussion of the advantages of the invention.

Claim Objections

The objections that claims 4 and 5 should depend from claim 3 rather than claim 1 is moot since claim 3 has been cancelled and its subject matter incorporated into claim 1.

At the Examiner's suggestion claim 12 has been amended to depend on claim 11. Claim 9 has been incorporated into claim 1, therefore, claims 10 and 11 have been amended to depend upon claim 1. It is believed these changes overcome the objections.

Claim Rejections – 35 USC § 112

This rejection of claim 13 is believed to have been overcome by the deletion of the phrase "or mixture thereof".

Claim Rejections

35 USC § 102(e)

Claims 1, 2 and 13 are rejected as being anticipated by Tarr, et al. (US6,459,011). It is suggested this rejection be withdrawn since the amendment of Claim 1 upon which claims 2 and 13 depend contain inventive elements not found within the teachings of Tarr. The remarks hereafter are also intended to apply to new claims 14-15. The patentees' invention is simply stated in Col. 3, lines 54-60, relied upon by the Examiner. The contaminated formations are treated by the patentees with a peroxide and a pre-formed cyclodextrin chelate catalyst, preferably an iron cyclodextrin chelate. Applicant, in contrast in the rejected claims, uses peroxides and a chelating agent which after injection into the

formation forms a heavy metal chelate which converts the peroxide to the oxidizing agent. The preferred chelating agent is an aminopolycarboxylate chelating agent.

The patentees suggest that their treating solutions be used at a pH of not greater than 6. See Col. 6, lines 17-19 and the pH adjustment is not important. The rejected claims, 1,2 and 13 require that the pH be at least 7

The most important part of applicant's invention is the formation of the metal chelant *in situ* by injecting a chelant into the contaminated soil or ground water which contains such metals. These metals are chelated by the chelant and are capable of oxidizing the peroxide. Such a finding is surprising since the many unknown factors present in underground environments that could interfere with or nullify the chelation reaction.

It is urged this *in situ* production of the chelant within the formation is not a part of the teaching of the Tarr patent and is incapable of being used as an anticipation in rejecting claims 1,2 and 13 as well as new claims 14 and 15.

The patentees specifically state at lines 31-36 of Col 6.

"For some systems, sufficient soluble iron or other metals may be present so that no additional catalyst is required. For example, soils with high Fe²⁺ content may not require addition of iron. Again this is an issue that needs to be addressed in studies of field applications of the technique"

A careful reading of this section of the patent indicates the patentees are speculating that when the formation contains iron no further addition of iron in any form is needed. This means that only the peroxide need be added under such circumstances. There is no direct suggestion to try adding peroxide and chelant (Emphasis added). This section of the reference is a suggestion to try. It is a speculative idea not of sufficient merit to raise it up to the level of the obvious to try standard that has been banned as a method of showing an

invention was not novel.. The speculative nature of the statement “--- may not require the addition of iron “ and “---is an issue that needs to be addressed---“ renders this as an invitation to undertake undue experimentation that might prove an idea. Undue experimentation cannot be required if novelty is to be negated The statement is a conception if anything at all; which does make it viable technology capable of being anticipatory or obviating.

It is well known that for a single reference to be anticipatory it must contain all its essential elements. (See Chisum on Patents, Donald S. Chisum Matthew Bender & Co, Release 76.) Vol 1, § 3.02, page 3-6. As demonstrated above the injection of the chelating agent alone into the soils or ground waters containing the divalent metals which element is required in all the rejected claims is not present in the Tarr reference. Further, the limitations in claim 1 upon claims 2 and 13 that are specific as to the chelating agents used and the pH at which they are employed are nowhere to be found in the teachings of Tarr. For these reasons and others discussed it is requested the rejection under 35 USC § 102 (e) be withdrawn.

Claim Objections

35 USC § 103 (a)

Claims 1-10 and 13 and inferentially new claims 14-15 stand rejected based on Watts et al 5,741,427 in view of Tarr et al. Watts was cited by applicant as related but not anticipatory or obviating art. While this patent is also generically directed to treating contaminated soils and ground waters with a peroxide and an iron catalyst the teachings of the patentee even when combined with the teachings of Tarr et al. are lacking in their ability to render the rejected claims obvious.

The treating agent of Watts is an oxidizing agent, such as a peroxide, combined with the reaction product of a ligand donor with a metal catalyst. Generically, the complex of the ligand donor and the metal catalyst is in all probability a chelate or related form of loosely bonded metal ligand species e.g. a clathrate. The preferred catalyst of Watts is iron sulfate and the ligand donor is phosphoric and its mono potassium salt; (see Col 5 lines 4-6). In the first paragraph on page 4 of the Office letter the examiner correctly states that the chelating agent is added to the divalent metal *and that it fails to teach addition of the chelating agent to soils or ground waters containing the divalent metals to produce the catalyst.* (Emphasis added) The combining of Tarr does not overcome the failure of Watts to teach addition of the chelant per se to the formations containing divalent metals.

As pointed out above in the detailed discussion of Tarr above, the closest that Tarr comes to such a disclosure is the suggestion to try adding the oxidizing agent only to divalent metal containing formations to utilize the heavy metals present to catalytically oxidize the oxidizing agents so that they may render harmless the contaminants present in the formations. *Tarr does not teach adding a chelating agent per se into the divalent metal containing formations.* (Emphasis added) This deficiency, combined with the fact, that the section of Tarr relied on by the examiner is purely speculative. It does not rise above the “obvious to try standard”, thus, rendering the Tarr patent woefully short of providing obviation when combined with Watts. Chisum on Patents, *Ibid.* Vol. 2 § 504[1] generically states, “A number of decisions reject ‘obvious to try’ as a test of obviousness under Section 103” Since there is no showing in the references of forming a

chelate in situ in accordance with the claims now presented for examination there is therefore no basis for rejecting the claims.

Watts does not even allude to the utilization of divalent metals present in the formation to be used in practicing his process. Further, his preferred process as set forth in Col 5, lines 9-12, is performed on site at ambient temperature by mixing the catalyst and ligand donor with water. This is typical of the prior art processes and teaches away from utilizing the formation's in situ divalent metals.

With respect to claim 1 Watts et al is deficient in showing the aminopolycarboxylates as being superior chelating agents for use in his process. As pointed out in Col. 5 lines 4-6 the preferred catalyst is phosphoric acid chelated iron with the iron source being iron sulfate. Watts *does not show aminopolycarboxylate heavy metal chelates as being catalysts for his process—rather they are considered as sources of divalent metals to react with his catalysts.* (Emphasis added) A careful reading of Col 4, lines 42-62 shows that the patentee equivocates iron chelates such as iron NTA with a host of other chelating agents and simple divalent metal salts—remembering that iron sulfate is his preferred source of iron.

The rejections of claim 1 is improper since in addition to the above deficiencies e.g. no showing of adding chelating agent alone to the formation, no showing is made in either reference as to the necessity of having the pH of the treating solution of at least 7.

Since Watts and Tarr are incapable of providing a basis of obviating the broader claims of the invention they cannot negate the novelty of the remaining claims, It is therefore believed the rejections set forth on page 4 and 5 dealing with rejection of claims 2 -10 are without merit. It is respectfully submitted these rejections are made by plucking

specific elements out of context from the references. Such an approach is impermissible hindsight reconstruction.

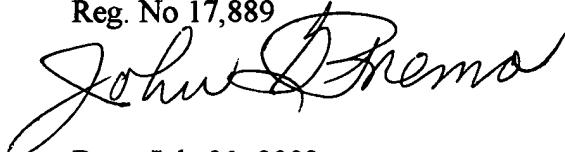
Allowable Subject Matter

Note is taken that claims 11-12 would be allowable if made to depend on the other claims presented. They now depend on modified claim 1 which clearly overcomes the rejections for the reasons set forth and are allowable.

It is believed that the claims as amended are allowable and such action is requested. If the claims are not- allowable but could be placed in better form then it requested the Examiner call Applicant's attorney to schedule an interview.

Respectfully submitted,

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